THE SOCIAL WASPS OF LOWER CALIFORNIA, MEXICO
(Hymenoptera: Vespidae)

By Roy R. Snelling[1]

Abstract: There are four genera of social Vespidae in Lower California: *Vespula* (two species), *Polistes* (seven species), *Mischocyttarus* (two species) and *Polybia* (one species). One new species, *Mischocyttarus fisheri,* is described from the Sierra Laguna and the genus *Polybia* is newly recorded from Lower California. Keys for all species are included, most species are illustrated and distribution data are given in full.

The social wasps of Lower California have never been the subject of a comprehensive study. Until relatively recently there has been very little material available; the only collection of note was that housed at the California Academy of Sciences, collected by A. E. Michelbacher and E. S. Ross in 1938 and by E. S. Ross and G. E. Bohart in 1941. This material was reported on, in part, by R. M. Bohart (1949) who described several new endemic *Polistes.* In subsequent years one additional *Polistes* was recorded from Lower California by Snelling (1955) and two species of *Vespula* were noted to be present by Bohart and Bechtel (1957).

None of the above studies was devoted exclusively to the wasps of this region, nor did they contain keys for these species. The present study has two purposes: to enumerate the species of social wasps of Lower California and to provide means for their identification through a series of keys. Most species are illustrated here and their distributions, as far as known, are indicated.

The Lower California peninsula is divided into two political regions: the State of Baja California in the north and the Territorio de sur de Baja California in the south. I have departed from customary procedure in the southwestern United States by referring to the region involved as Lower California, rather than Baja California. The use of Lower California in American entomological literature dates at least as far back as 1875, and has been frequently used in subsequent years, so that the precedent is well-established. Furthermore, I feel that the existence of a discrete state of Baja California is a source of possible confusion. Within the text Lower California refers to the peninusla as a whole and Baja California to the state in the northern portion of the peninsula. The dividing line between the two political regions, 28° N, is also an approximate boundary for some of the species. This study includes the species of the entire peninsula and of the islands in the Gulf of California. The collection data for each species are cited from north to south and are broken down by region, as follows: *Baja Calif.* (Estado de Baja California), *Terr. Sur* (Territorio de sur de Baja California) and *Golfo de Calif.* (islands in the Golfo de California). Excluded from this study are the Revillagigedo Islands, located some 300 miles south of Cabo San Lucas. One social wasp, *Polistes dorsalis clarionensis* R. Bohart, is reported from these islands.

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In northern Baja California the fauna is essentially an extension of that of southern California. East of the escarpment of the Sierra Juarez the wasps are typically lower Sonoran Desert species extending south to about Bahia San Luis Gonzaga. Here only *Polistes* is found: the ubiquitous *P. fuscatus centralis* Hayward and *P. major palmarum* Bequaert, a species restricted to native palm grove canyons. West of the crest of the Sierra Juarez the species are those of the chaparral of southern California: *Vespula pensylvanica* (Saussure), *V. sulphurea* (Saussure), *P. fuscatus aurifer* Saussure, *P. dorsalis californicus* R. Bohart and, probably, *Mischocyttarus flavitarsis* (Saussure). One anomalous species, *Polybia diguetana* (du Buysson), is present in this area. This is known from a single collection of two specimens taken at Ensenada and may be an accidental introduction.

The area between Bahia San Luis Gonzaga and El Arco at 28° N is poorly represented in the material studied. The peninsular form of *P. f. centralis* is common; *P. major slevini* R. Bohart is found at Bahia de Los Angeles and *P. rossi* R. Bohart is found at Cataviña. The latter two are rare, however, this far north. From 28° N southward, they become more common. This area seems to be the northern limit of *P. exclamans lineonotus* R. Bohart although it may occur further north along the Gulf side of the peninsula. The fauna, from 28° N, remains essentially unchanged to the south except in the mountains of the Cape Region. Here, *Polistes dorsalis californicus* and *Mischocyttarus fisheri,* new species are found. The subtropical element of mainland Mexico is not reflected in the Cape Region. The lack of this element is of interest since some other groups of insects show definite affinities with the fauna of the adjacent mainland. The ants of Lower California, now being studied, exhibit distributional characteristics similar to those of the vespids.

KEY TO GENERA OF SOCIAL VESPIDAE IN LOWER CALIFORNIA

1. Abdomen petiolate, the first segment more than twice as long as broad, the second segment abruptly swelling at base 2
   Abdomen sessile or subsessile, the first segment as broad or broader than long, the second not swelling abruptly at base 3

2. Third and fourth segments of mid and hind tarsi asymmetrical, inner apical lobe distinctly longer than outer; mesepisternum divided above by an oblique suture into upper and lower plates .... *Mischocyttarus*
   Third and fourth segments of mid and hind tarsi symmetrical; mesepisternum not divided above .... *Polybia*

3. First tergite broadly convex in lateral view; clypeal apex narrow, pointed in front view .... *Polistes*

First tergite vertically truncate on basal one-half or more; clypeal apex broad, concave or truncate .... *Vespula*

KEY TO SPECIES OF *VESPULA* IN LOWER CALIFORNIA

Occipital carina of female and worker complete from inferior mandibular articulation to near top of eye; sternite VII of male broadly and shallowly emarginate apically; mesoscutum all dark; female and worker with scape black beneath .... *pensylvanica* (Saussure)

Occipital carina of female and worker not reaching inferior mandibular articulation; sternite VII of male narrowed apically, not emarginate; mesoscutum with two prominent longitudinal lines; scape yellow beneath .... *sulphurea* (Saussure)

Vespula (Vespula) pensylvanica (Saussure)

Vespa pensylvanica Saussure, 1857. Stettin. Entomologische Zeitung 18: 117. ♀.

Vespa occidentalis Cresson, 1874. Trans. Amer. Ent. Soc. 5: 100. ♀, ⚲.

Vespula pensylvanica, Bequaert, 1932. Ent. Amer., n.s. 12: 95-97. ♀, ⚲, ♂.

Vespula pennsylvanica [sic], Miller, 1961. Canad. Ent. 93 (Suppl. 22): 13-15. ♀, ⚲, ♂.

This common western yellow-jacket is found in northern Baja California. Bohart and Bechtel (1957) have recorded this species from Agua Caliente, and I have seen the following.

SPECIMENS EXAMINED: Baja California.: 5 ⚲⚲, Arroyo Santo Tomas, June 22, 1963 (E. L. Sleeper; LBSC); 5 ♀♀, Aguajito Spring, Valle de la Trinidad, Mar. 17, 1936 (C. F. Harbison; SDM); 1 ♀, San Felipe, Apr. 27, 1953 (W. R. Lower; LACM) [*note:* this female was most probably taken in the Sierra Juarez, west of San Felipe. It seems quite unlikely this species occurs in such an arid habitat as San Felipe]; 14 ⚲⚲, El Progreso, El Tajo Can., Sierra Juarez, Sept. 10, 1958 (F. S. Truxal & J. R. Northern; LACM).

Vespula (Vespula) sulphurea (Saussure)

Vespa sulphurea Saussure, 1854. Etudes sur la Familie des Vespides 2: 137. ♀.

Vespula sulphurea, Bequaert, 1932. Ent. Amer., n.s., 12: 111-112. ♀, ⚲, ♂.

I have seen no specimens of this very distinctive wasp from Baja California, but Bohart and Bechtel (1957) state that it is found there, and their map indicates a record inland from Bahia San Quintin. This species should occur in the Sierra San Pedro Martir and Sierra Juarez, probably south to about Valle de la Trinidad.

KEY TO SPECIES AND SUBSPECIES OF *Polistes* IN LOWER CALIFORNIA

1. Malar area about twice as long as distance between antennal sockets; prepectal suture present, sometimes indistinct; sternite VII of male without median tubercle 2
Malar areas as long as, or less than, distance between antennal sockets; prepectal suture always absent; sternite VII of male with or without median tubercle 3

2. At least 75 percent (usually much more) of scutellum yellow; propodeum usually immaculate, rarely with two small median spots near flange; malar area darker than adjacent portions of clypeus... *major slevini* R. Bohart
No more than 25 percent of scutellum yellow; propodeum with two prominent longitudinal stripes on lower two-thirds or three-fourths; malar area yellow, concolorous with clypeus .... *major palmarum* Bequaert

3. In dorsal view, tergite I distinctly broader than long; mesopleura below uniformly finely and closely punctate, without scattered large punctures; sternite VII of male with median tubercle 4
In dorsal view, tergite I a little longer than broad; mesopleura below finely punctate, with slightly shiny interspaces, and distinct, scattered larger punctures; sternite VII of male without median tubercle .... *exclamans lineonotus* R. Bohart

4. Males, antennae thirteen segmented 5
Females, antennae twelve segmented 8

5. Clypeus separated from inner eye margin by a distance less than an ocellar diameter, frequently contiguous with eyes for a short distance; aedeagus with teeth of variable size 6
Clypeus separated from inner eye margin by a distance exceeding an ocellar diameter; aedeagus with teeth of uniform size. .... *dorsalis californicus* R. Bohart

6. Lateral ocelli separated from inner eye margin by two or more times diameter of anterior ocellus; apical four segments of antennae not pruinose beneath, distinctly polished; propodeal striae usually fine, close; lamella of propodeal valve yellow 7
Lateral ocelli separated from inner eye margin by about 1.3 times diameter of anterior ocellus; apical four segments of antennae largely delicately pruinose beneath, apical segment sometimes slightly shiny; propodeal striae usually quite coarse; lamella of propodeal valve largely translucent ferruginous .... *rossi* R. Bohart

7. Ground color of thorax largely black .... *fuscatus aurifer* Saussure
Ground color of thorax largely ferruginous .. *fuscatus centralis* Hayward

8. Ground color of thorax largely ferruginous 9
Ground color of thorax largely black .... *fuscatus aurifer* Saussure

9. Propodeum usually with 20 or more fine, transverse striae; but sometimes with a few coarse striae; longitudinal yellow stripes usually present on propodeum; flanges of propodeal valve yellow; angle of clypeal apex usually about 95°; clypeus as broad or broader than long 10
Propodeum with 15-20 coarse striae, rarely finely striate; longitudinal yellow stripes of propodeum absent; flanges of propodeal valve largely translucent ferruginous; angle of clypeal apex usually about 90°; clypeus slightly longer than broad. .... *rossi* R. Bohart
10. Tergite I with quadrate median ferruginous mark; if tergite II largely yellow, posterior margin of ferruginous mark is transverse and lateral yellow area is broadly confluent with apical yellow band .... *dorsalis californicus* R. Bohart
Tergite I largely ferruginous with yellow apical and lateral margins; if with a quadrate median mark, then ferruginous mark of tergite II acuminate behind *or* lateral yellow area separated from apical band as a large spot .... *fuscatus centralis* Hayward

Polistes major palmarum Bequaert

Figures lg; 2g, n.

Polistes major palmarum Bequaert, 1936. Ent. News 47: 11. ♀.

This light red and yellow wasp has previously been known from Riverside and San Diego Counties of California, where it occurs in natural palm groves. Nests are usually constructed beneath the fronds of the palms. The Baja California records are all from habitats similar to those in California.

Specimens examined: *Baja Calif.*: 2 ♀♀, San Matias Pass, 8 mi. S., May 16, 1960 (E. L. Sleeper; LBSC); 14 ♀♀, Cañon de Guadalupe, Sierra Juarez, May 2-3, 1964 (R. R. Snelling, E. M. Fisher; LACM); 1 ♀, El Tajo Cañon, Sierra Juarez, Sept. 9, 1957 (J. Roberds; LACM); 2 ♂♂, 5 ♀♀, same locality, Sept. 11, 1958 (J. R. Northern; LACM).

Polistes major slevini R. Bohart

Figures lf; 2f, m; 3d

Polistes major slevini R. Bohart, 1949. Pan-Pacific Ent. 15: 103. ♂ ♀.

This form is similar to the foregoing subspecies, but the ferruginous color is darker, the propodeum usually lacks yellow stripes and the scutellum is either wholly yellow or with two small ferruginous spots in the middle. As with *P. m. palmarum,* this subspecies is found in the vicinity of natural palm groves and frequently nests under the living fronds.

Specimens examined: *Baja Calif.*: 2 ♀♀, Bahia de los Angeles, 1 mi. S., June 11, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Santa Gertrudis, April 23, 1940 (C. F. Harbison; SDM). *Terr. Sur*: 1 ♂, San Ignacio, June 17-18, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, La Virgen (shrine), Sept. 14, 1959 (C. F. Harbison; SDM); 2 ♂♂, 1 ♀, Rancho El Coyote, May 23, 1961 (R. Maynard & J. Honey; LACM); 1 ♀, Bahia Concepcion, April 24, 1958 (E. Y. Dawson; LACM); 1 ♀, Loreto, Sept. 29, 1959 (C. F. Harbison; SDM); 1 ♂, 2 ♀♀, Rancho Potrero, May 9, 1959 (D. Patterson; UCR), "wasps living in palm head"; 1 ♀, La Paz, 13 mi. W., Nov. 11, 1965 (W. Ewart & R. C. Dickson; UCR), on *Tecoma stansburyi*; 2 ♀♀, La Paz, 10 mi. NW, Oct. 6, 1941 (E. S. Ross & G. E. Bohart; CAS); 5 ♀♀, La Paz, June 3, 1921 (E. P. Van Duzee; CAS); 1 ♀, same locality, June 26, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, La Paz, 20 kilo. SE, Nov. 11, 1952 (C. B. Heller; SDM); 1 ♀, Todos Santos, 10 mi. N., Dec. 26, 1958 (H. B. Leech; CAS); 4 ♀♀, Todos Santos, Aug. 12, 1919 (J. R. Sleven; CAS); 1 ♀, same locality, Sept. 16, 1959 (C. F. Harbison; SDM); 1 ♀, same locality, Dec. 13, 1928 (A. E. Coburn; LACM); 1 ♂, Colonia Calles, Sept. 15, 1959 (C. F. Harbison; SDM); 1 ♂, 1 ♀, Triunfo, July 8, 1919 (G. F. Ferris; LACM); 1 ♀, same locality, July 7, 1939 (A. E. Michelbacher & E. S. Ross; CAS); 1 ♀, Las Animas, Sierra Laguna, Oct. 12, 1941 (E. S. Ross & G. E. Bohart; CAS); 1 ♀, Sierra Laguna, April 5-6, 1947 (CAS); 1 ♀, Agua Caliente, April 22, 1947 (LACM); 12 ♀♀, Boca de la Sierra, Mar. 5-6, 1969 (R. R. Snelling; LACM), mostly at aphid honeydew on native bamboo; 1 ♀, San Jose del Cabo, July 15, 1967 (E. M. Fisher; LBSC); 1 ♀, Cabo San Lucas, 3.4 mi. NE, Jan. 1, 1959 (H. B. Leech; CAS). *Golfo de Calif.*: 1 ♀, Punta Gordas, Isla Cerralbo, Mar. 20, 1953 (P. H. Arnaud; CAS); 1 ♀, Isla Partida, Apr. 17, 1958 (E. Y. Dawson; LACM); 3 ♀♀, Isla Espiritu Santo, Mar. 7, 1928 (T. Craig; CAS). In addition to the above localities, Bohart (1949) recorded a specimen from Las Parras, which I have not seen.

Polistes exclamans lineonotus R. Bohart

Figures 1h; 2h, o; 3e

This slender wasp, with paired mesonotal stripes, is a distinctive element of the peninsular fauna. It is very common in the southern third; nests are frequently built in mesquite trees and, during the winter months, the trees may be liberally festooned with several years' accumulation of nests.

Unlike the nominate form, *P. e. lineonotus* is an aggressive wasp in the vicinity of the nests and stings very readily. Colonies, in the Cape Region, may persist throughout the year. I have seen populous nests (25 or more wasps) in this region in early March.

Because this wasp is nowhere in contact with the range of other subspecies of *P. exclamans*, its color pattern is quite stable. The paired mesoscutal stripes are almost invariably present in females. The ground color varies from light ferruginous to blackish, but the pleurae and propodeum seem always to be blackish. Generally, specimens from the Gulf islands have the ferruginous color replaced by blackish, but this condition is found in samples from the peninsula. The male color pattern seems to parallel that of the females, but fewer males are available for study; there is a noticeable tendency in the males for a loss of mesoscutal stripes; the mesoscutum is concolorous ferruginous in about a third of the males seen.

SPECIMENS EXAMINED: *Baja Calif.*: 1 ♀, Santa Gertrudis, Apr. 24, 1940 (C. F. Harbison; SDM). *Terr. Sur*: 62 ♀♀, San Ignacio, June 17-18, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Mulege, Feb. 27, 1969 (R. R. Snelling; LACM); 4 ♀♀, Mulege, May 14, 1921 (E. P. Van Duzee; CAS); 3 ♀♀, Puerto Escondido, Feb. 27, 1928 (T. Craig; CAS); 1 ♂ [Bahia] Agua Verde, May 26, 1921 (E. P. Van Duzee; CAS); 8 ♀♀, San Miguel Comondu, 2 mi. SW, June 23, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 2 ♀♀, San[to] Domingo, July 19, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 22 ♀♀, San[to] Domingo, Oct. 23, 1941 (E. S. Ross & G. E. Bohart; CAS); 1 ♂, 3 ♀♀, Santo Domingo, Nov. 16, 1941 (F. Gander; SDM); 1♀, Santa Rita, 20 mi. SE, June 25, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, La Paz, 12 mi. W, Nov. 11, 1965 (W. Ewart & R. Dickson; UCR), on *Tecoma stansburyi*; 1 ♀, La Paz, June 4, 1921 (E. P. Van Duzee; CAS); 1 ♂, 9 ♀♀, La Paz, June 26, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, La Paz, June 28, 1919 (J. R. Slevin; CAS); 1 ♀, La Paz, July 7, 1953 (R. R. Snelling; LACM); 1 ♀, La Paz, Sept. 13, 1959 (C. F. Harbison; SDM); 1 ♀, La Paz, Oct. 9, 1955 (F. X. Williams; CAS); 1 ♀, San Bartolo, Oct. 24, 1941 (F. Gander; SDM); 1 ♂, 2 ♀♀, Todos Santos, 10 mi. N, Dec. 26, 1958 (H. B. Leech; CAS); 1 ♀, Todos Santos, Aug. 12, 1919 (J. R. Slevin; CAS); 7 ♀♀, Todos Santos, Sept. 14-16, 1959 (C. F. Harbison; SDM); 4 ♀♀, Colonia Calles, Sept. 15, 1959 (C. F. Harbison; SDM); 1 ♂, 4 ♀♀, Triunfo, July 8, 1919 (G. F. Ferris; LACM); 1 ♀, 4 ♀♀, between San Jose del Cabo and Triunfo (Albatross Expedition, 1911; AMNH); 1 ♀, [Rancho] Buena Vista, La Ribera, May 16, 1947 (LACM); 65 ♀♀, Boca de la Sierra, Mar. 5-6, 1969 (R. R. Snelling; LACM), 15 at nest in *Prosopis* tree, 11 at aphid honeydew; 11 ♀♀, Boca de la Sierra, June 27-28, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 3 ♀♀, Caduaña, 4.2 mi. W, Mar. 5, 1969 (R. R. Snelling; LACM); 1 ♀, Santa Anita, 4 mi. SW, Mar. 4, 1969 (R. R. Snelling; LACM); 1 ♂, 2 ♀♀, San Jose del Cabo, 5 mi. N, Nov. 8, 1951 (W. Ewart & R. Dickson; UCR); 6 ♂♂, 3 ♀♀, San Jose del Cabo, Nov. 11, 1952 (C. F. Harbison; SDM); 1 ♀, San Jose del Cabo, 1 mi. E, June 28, 1967 (E. M. Fisher; LBSC); 1 ♀, San Jose del Cabo, 11 mi. W, June 28, 1967 (E. M. Fisher; LBSC); 2 ♀♀, Cabo San Lucas, Mar. 16, 1953 (J. P. Figg-Hoblyn; CAS). *Golfo de Calif.*; 1 ♀, Isla San Jose, May 28, 1921 (E. P. Van Duzee; CAS); 2 ♀♀, Rancho Los Dolores, Isla San Jose, Aug. 11, 1965 (K. Lucas; CAS); 1 ♂, Isla Partida, Apr. 17, 1958 (E. Y. Dawson; LACM); 1 ♀, Isla Cerralbo, Apr. 9, 1966 (J. McLean; LACM); 9 ♀♀, Ruffo Rancho, Isla Cerralbo, Oct. 30, 1961 (R. C. Banks & M. Soule; CAS).

Polistes fuscatus aurifer Saussure

Figures 1c; 2c, j.

Polistes aurifer Saussure, 1853. Etudes sur la Familie des Vespides 2: 78. ♀.

Polistes anaheimensis Provancher, 1888. Addit. Corr. Faune Ent. Canada Hymen., p. 423. ♂ ♀.

Polistes fuscatus aurifer, Bequaert, 1940. Jour. N. Y. Ent. Soc. 48: 21.

Polistes fuscatus montanus Bequaert, 1940. *Op. cit.,* p. 26-27. ♀ ♂.

This subspecies barely enters Baja California from southern California where it is quite common. I have studied only two samples from Baja California, as noted below. These are from areas where *P. f. centralis* Hayward also is found and several specimens are intermediate between the two forms. The predominately black ground color of the thorax is partially replaced by ferruginous in these intermediates.

SPECIMENS EXAMINED: *Baja Calif.*: 11 ♀♀, Aguajito Spring, Valle de la Trinidad, March 20, 1936 (C. F. Harbison; SDM); 1 ♂, Cataviña, June 19, 1938 (A. E. Michelbacher & E. S. Ross; CAS).

Polistes fuscatus centralis Hayward

Figures 1a, b; 2a, b, i; 3a

Polistes fuscatus centralis Hayward, 1933. Proc. Utah Acad. Sci. 10: 143. ♀.

This is one of the commonest social wasps over most of the peninsula. It is apparently absent only from the northwestern area, west of the Sierra Juarez, where it is replaced by *P. f aurifer.* The population over much of this area is characterized by an atypical color pattern present in both sexes. Specimens representing a more "typical" color pattern occur only in northeastern Baja California from the Mexicali area to Valle de la Trinidad. South of the Valle de la Trinidad the ferruginous ground color becomes much more extensive, especially on the abdomen. The tergites become largely ferruginous, often only with narrow apical yellow fasciae; small lateral yellow spots may be present on the second tergite. These specimens from the more arid regions also average much smaller than is usual and are easily confused with *P. d. californicus* R. Bohart. Some records here attributed to *P. f. centralis* have been previously thought to belong to *P. d. californicus.* These prior determinations were based upon isolated females. The large number of males now available have indicated that *P. d. californicus* is absent over much of the peninsula while *P. f. centralis* is abundant.

The small, largely ferruginous females here assigned to *P. f. centralis* differ slightly from *P. d. californicus* in their color pattern of the abdomen. The first tergite has a narrow apical yellow fascia often extending forward along the lateral margin; a lateral spot may or may not be present and it may or may not be free of the apical fascia. In all specimens which I have studied of *P. d. californicus* from this area, there is a broad apical fascia joining a large, quadrate lateral spot, so that the first tergite has a small rectangular ferruginous mark on the mediobasal area. The second tergite of *P. f. centralis* is highly variable in its markings; it may be largely yellow, with the ferruginous area limited to the basal one-third or less. In these specimens the posterior margins of the ferruginous areas converge toward the midline so that the area is roughly triangular (fig. 1a). In specimens which are a little more extensively ferruginous, the ferruginous area is expanded beyond the point of convergence so that a poorly defined lateral yellow spot is demarked (fig. 1b). Still more extensively ferruginous individuals may have a free yellow spot or none at all. In *P. d. californicus* the ferruginous area is either truncate (fig. 1e) or oblique behind, almost always with a definitely quadrate or subquadrate lateral yellow spot which is always broadly attached to the apical fascia.

Structural characters which will reliably separate the females have not been found. A few trends do exist and, when used cautiously, may aid in coming to a correct determination. In *P. f. centralis* the genae, at the termination of the occipital carina, are usually no wider than the eye in profile. In about half the material examined, they are slightly narrower than the eyes. Rarely was an individual found in which the genae were wider than the eyes. In *P. d. californicus* about half the specimens had the genae and eyes of about equal width, while the genae were a little broader than the eyes in a great many specimens. In a few, the genae were narrower than the eyes (the measurements for *P. d. californicus* included samples from California; those of *P. f. cen*tralis were all from the peninsula).

The transverse propodeal striae tend to differ between the two wasps. Those of *P. f. centralis* are usually of variable size, with some coarser rugulae interspersed among the fine; there are often a few coarse rugulae near the spiracles. In *P. d. californicus* the rugulae are generally more uniform in size, finest above, near the spiracles, becoming gradually coarser below; coarser rugulae are rarely spaced among the fine, and are usually absent from the spiracular area.

The lateral propodeal lamella of *P. d. californicus* is usually evenly rounded onto the posterior, vertical surface, without a carina at the juncture of the two faces. That of *P. f. centralis* usually has a fine carina, at least on the inner half.

SPECIMENS EXAMINED: *Baja Calif.:* 1 ♀, Ejido Nayarit (about 21 mi. SE of Mexicali), July 14, 1953 (E. O. Johnson; LACM); 1 ♂, Mexicali, 36-42 kilom. S, June 29, 1953, (R. R. Snelling; LACM), on *Melilotus alba;* 3 ♀♀, Mexicali, 45 kilom. S, June 25, 1953 (R. R. Snelling; LACM), one with larva of *Alabama argillacea* (Hbn.), two from nest under eaves of dwelling; 1 ♀, El Mayor, June 15, 1952 (M. Cazier, W. Gertsch & R. Schrammel; AMNH); 1 ♀, Palacio, 20 mi. S, Apr. 1939 (C. D. Michener; CAS), on

Larrea; 5 ♀♀, San Jose Castillo, 12 mi. E, Nov. 11, 1960 (E. L. Sleeper; LBSC); 2 ♀♀, El Tajo Can., Sierra Juarez, Sept. 9, 1957 (J. Roberds; LACM); 13 ♀♀, Aguajito Spring, Valle de la Trinidad, Mar. 20, 1936 (C. F. Harbison; SDM); 16 ♀♀, Las Arrastras [de Arriola], 7 mi. N and 4 mi. S, June 8, 9, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Mission Calamajue, 3.2 mi. S, June 10, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Bahia de los Angeles, June 27, 1921 (E. P. Van Duzee; CAS); 3 ♀♀, Bahia de los Angeles, 1 mi. S, June 11, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Santa Gertrudis, Apr. 23, 1940 (C. F. Harbison; SDM); 2 ♀♀, El Arco, June 16, 1967 (E. L. Sleeper & E. M. Fisher; LBSC). *Terr. Sur:* 2 ♂♂, 2 ♀♀, El Arco Mine, 14, 30 & 40 mi. S, June 23, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 6 ♂♂, San Ignacio, 15 mi. N, June 26, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 2 ♂♂, San Ignacio, June 26, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 17 ♂♂, 14 ♀♀, San Ignacio, June 17-18, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♂, 1 ♀, San Ignacio, 10 mi. E, Sept. 30, 1941 (E. S. Ross & G. E. Bohart; CAS); 8 ♀♀, Santa Rosalia, 17 mi. S, June 18, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Mulege, May 15, 1921 (E. P. Van Duzee; CAS); 2 ♀♀, Mulege, 30 mi. S, June 21, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♂, Coyote Cove, Bahia Concepcion, Oct. 1, 1941 (E. S. Ross & G. E. Bohart; CAS); 1 ♂, Rancho El Coyote, Bahia Concepcion, June 23, 1961 (R. Maynard & J. Honey; LACM); 2 ♂♂, 2 ♀♀, Bahia Concepcion, east side, Apr. 24, 1958 (E. Y. Dawson; LACM); 1 ♀, Bahia Escondido, June 14, 1921 (E. P. Van Duzee; CAS); 1 ♂, 4 ♀♀, Puerto Escondido, Apr. 21, 1958 (E. Y. Dawson; LACM); 1 ♂, 6 ♀♀, Bahia Agua Verde, Apr. 20, 1958 (E. Y. Dawson; LACM); 1 ♀, San Miguel Comondu, 2 mi. SW, June 23, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, San Miguel Comondu, 19 mi. SW, June 23, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Santa Rita, 20 mi. SE, June 25, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 8 ♀♀, La Paz, June 3-14, 1921 (E. P. Van Duzee; CAS); 2 ♂♂, 1 ♀, La Paz, June 28, 1919 (J. R. Slevin; CAS); 7 ♀♀, Bahia de los Muertos, Dec. 20, 1958 (H. B. Leech; CAS); 3 ♂♂, 3 ♀♀, San Antonio, July 12, 1919 (G. F. Ferris; LACM); 2 ♀♀, La Ribera, July 19, 1919 (G. F. Ferris; LACM; 1 ♀, Boca de la Sierra, Mar. 6, 1969 (R. R. Snelling; LACM), at aphid honeydew; 1 ♀, between San Jose del Cabo and Triunfo (Albatross Exped., 1911; AMNH); 1 ♀, San Jose del Cabo, 1 mi. E, July 15, 1967 (E. M. Fisher; LBSC). *Golfo de Calif.:* 1 ♂, Isla Monserrate, May 24, 1921 (E. P. Van Duzee; CAS); 2 ♀♀, Isla San Jose, Apr. 18, 1958 (E. Y. Dawson; LACM).

Polistes dorsalis californicus R. Bohart

Figures 1e; 2e, 1; 3c

Polistes hunteri californicus R. Bohart, 1949. Pan-Pacific Ent. 15: 101. ♂ ♀.

Dr. Bohart examined the type of *Vespa dorsalis* Fabricius and found it to be a *Polistes,* identical to *P. hunteri neotropicus* Bequaert *(personal communication).* The Fabrician name has traditionally been applied to a eumenine species. But, since it is acutally a *Polistes,* the name has priority over that of Bequaert so that the various forms attributed to *P. hunteri* Bequaert must now be transferred to *P. dorsalis.* The eumenine species takes its first available name, presumably *Odynerus crypticus* Say; this wasp is now placed in the genus *Euodynerus.*

While *P. d. californicus* is probably fairly abundant in the oak and chaparral areas of Baja California, it is absent over most of the peninsula. There are but three records for it in the Territorio Sur. Because of their distinctive facial structure the males of this wasp are easily separated from the forms of *P. fuscatus* (Fabricius) in the same area. The females are much less readily separated, however, and in the absence of males some records which might be attributed to this wasp have been assigned to *P. f. centralis.* In placing isolated females as *P. d. californicus* I have followed a fairly rigid, and possibly unrealistic, set of criteria. My justification is that the separation achieved is, so far as can now be demonstrated, supported by available males.

There are two specimens from the Cape region. The one from San Jose del Cabo is a perfectly typical male in all its markings. The second specimen, also a male, is from La Laguna, at an elevation of 5500 feet in the Sierra Laguna. In its structural features it seems inseparable from the other males of this wasp. Its ferruginous markings, however, are quite extensive and this specimen closely resembles some males of *P. f. centralis* with reduced yellow maculae.

SPECIMENS EXAMINED: *Baja Calif.:* 4 ♀♀, Aguajito Spring, Valle de la Trinidad, Mar. 20, 1936 (C. F. Harbison; SDM); 2 ♂♂, 6 ♀♀, El Tajo Can., Sierra Juarez, Sept. 11, 1958 (J. R. Northern; LACM). *Terr. Sur:* 2 ♀♀, San Ignacio, June 17-18, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♂, La Laguna, Sierra Laguna, July 7-10, 1967 (E. M. Fisher; LBSC); 1 ♂, San Jose del Cabo, Nov. 11, 1952 (C. F. Harbison; SDM).

Polistes rossi R. Bohart

Figures 1d; 2d, k; 3b

Polistes rossi Bohart, 1949. Pan-Pacific Ent. 25: 99-100. ♂ ♀.

This large, basically ferruginous wasp is apparently not common. The male is easily recognized by the large ocelli. The females are similar to the peninsular variant of *P. f. centralis,* but are larger, have an acute clypeal apex and a more coarsely striate propodeum. The propodeal character is subject to variation and some specimens have the striae uniformly as fine as those of *P. f. centralis.* A seemingly consistent feature of the females is that the lateral lamella of the propodeal valve is almost entirely clear ferruginous, rather than opaque yellow as in *P. f. centralis* and *P. d. californicus.*

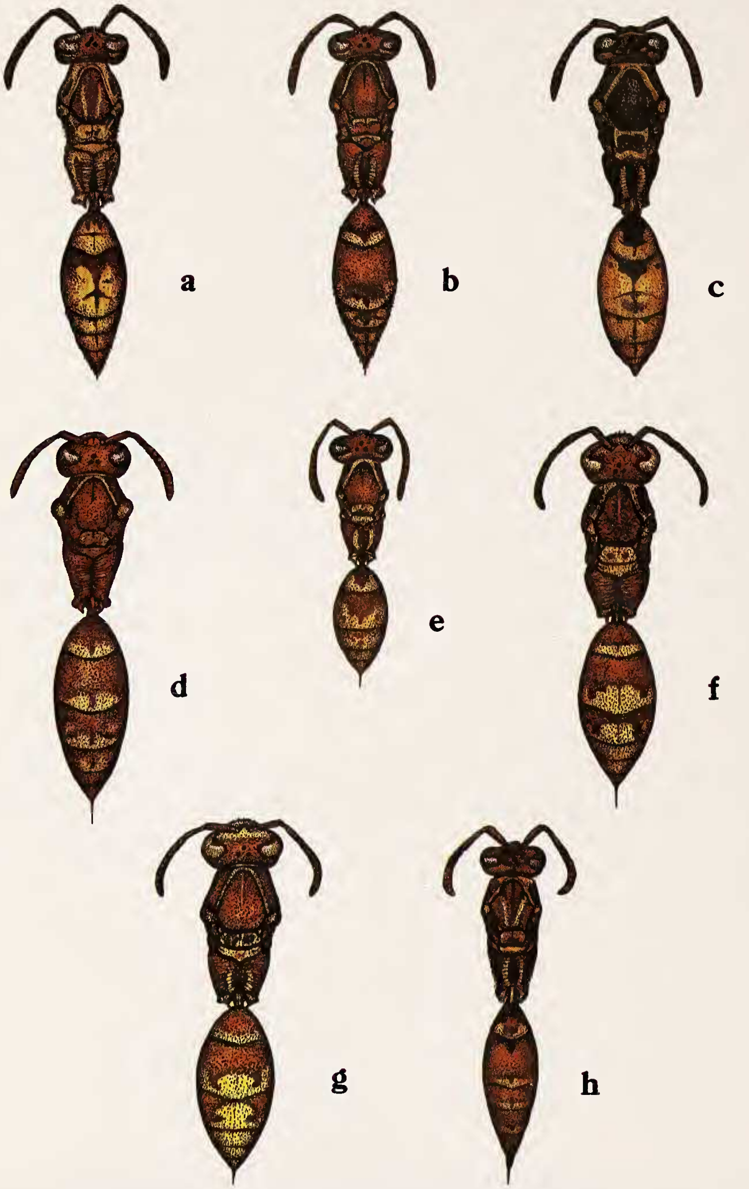

Figure 1. Dorsal aspect of *Polistes* females: a, *P. fuscatus centralis*, xanthic form; b, same, peninsular form; c, *P. fuscatus aurifer;* d, *P. rossi;* e, *P. dorsalis californicus;* f, *P. major slevini;* g, *P. major palmarum;* h, *P. lineonotus*. All figures drawn to same scale.

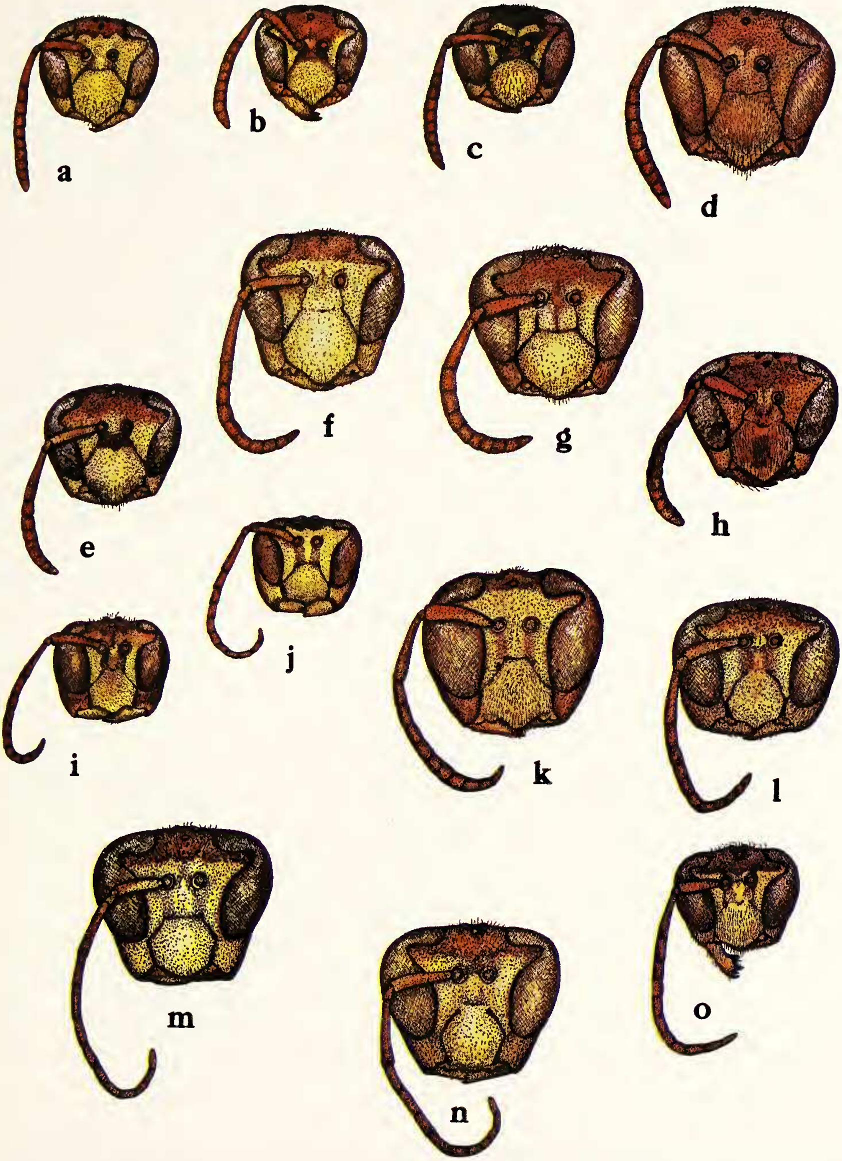

Figure 2. Heads of *Polistes* spp.: a, *P. fuscatus centralis*, ♀, xanthic form; b, same, ♀, peninsular form; c, *P. fuscatus aurifer*, ♀; d, *P. rossi*, ♀; e, *P. dorsalis californicus*, ♀; f, *P. major slevini*, ♀; g, *P. major palmarum;* h, *P. lineonotus*, ♀; i, *P. fuscatus centralis*, ♂; j, *P. fuscatus aurifer*, ♂; k, *P. rossi*, ♂; l, *P. dorsalis californicus*, ♂; m, *P. major slevini*, ♂; n, *P. major palmarum;* o, *P. lineonotus*, ♂. All figures drawn to same scale.

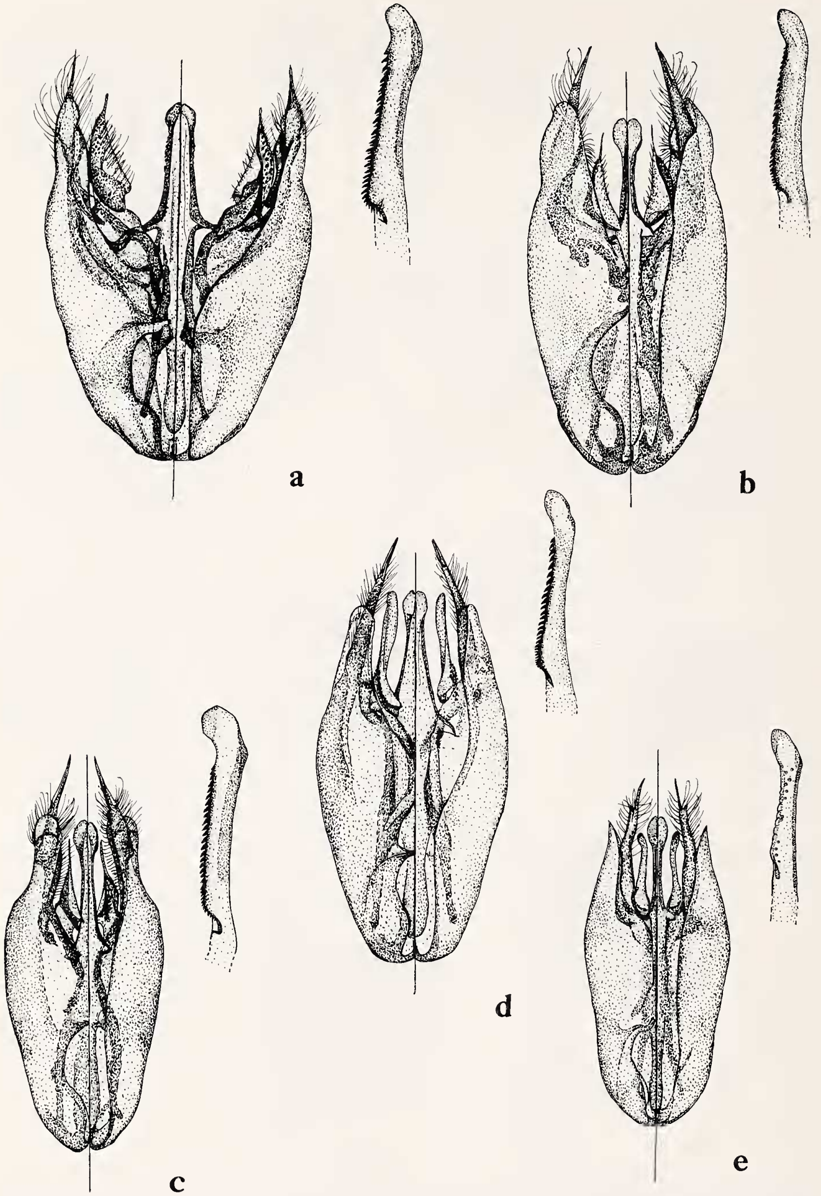

Figure 3. *Polistes* spp., male genitalia (right half dorsal aspect, left half ventral aspect) and lateral aspect of aedeagus (enlarged): a, *P. fuscatus centralis;* b, *P. rossi;* c, *P. dorsalis californicus;* d, *P. major slevini;* e, *P. lineonotus.* All figures drawn to same scale.

The habits of this uncommon wasp are largely unknown. It is regarded with considerable caution by inhabitants of areas where it occurs; the sting is said to be more painful than that of *P. e. lineonotus* or *P. f. centralis*. Nests are constructed on vertical rock faces of arroyos and washes, fully exposed.

SPECIMENS EXAMINED: *Baja Calif.:* 1 ♂, Cataviña, June 19, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 2 ♀♀, Santa Gertrudis, Apr. 24, 1940 (C. F. Harbison; SDM); 1 ♀, El Arco, June 16, 1967 (E. M. Fisher; LBSC). *Terr. Sur:* 1 ♀, El Arco, 15 mi. S, Aug. 26, 1959 (F. G. Werner; CAS); on mesquite; 2 ♂♂, El Arco, 20 mi. S, Sept. 30, 1941 (E. S. Ross & G. E. Bohart; CAS); 2 ♀♀ San Ignacio, 15 mi. N, July 26, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 2 ♂♂, San Ignacio, 10 mi. E, Sept. 30, 1941 (E. S. Ross & G. E. Bohart; CAS); 5 ♀♀, Mulege, 30 and 37 mi. S, June 21, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♀, Coyote Cove, Bahia Concepcion, June 29, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 1 ♀, Bahia Concepcion, Apr. 6-10, 1911 (Albatross Expedition, 1911; AMNH); 1 ♂, 2 ♀♀, Rancho El Coyote, Bahia Concepcion, June 23, 1961 (R. Maynard & J. Honey; LACM); 1 ♂, La Virgen Shrine, Sept. 14, 1950 (C. F. Harbison; SDM); 1 ♀, Canipole, Oct. 2, 1941 (E. S. Ross & G. E. Bohart; CAS); 1 ♂, Santo Domingo, Nov. 16, 1941 (F. Gander; SDM); 1 ♀, El Refugio, 15 mi. N, July 4, 1938 (A. E. Michelbacher & E. S. Ross; CAS); 1 ♀, La Paz, 22 mi. W, June 25, 1967 (E. L. Sleeper & E. M. Fisher; LBSC); 1 ♂, La Paz, Oct. 6, 1955 (F. X. Williams; CAS); 1 ♂, Todos Santos, 10 mi. N, Dec. 26, 1958 (H. B. Leech; CAS); 1 ♀, Boca de la Sierra, Mar. 6, 1969 (R. R. Snelling; LACM), at aphid honeydew; 1 ♀, Santa Anita, 4 mi. SW, Mar. 4, 1969 (R. R. Snelling; LACM); 5 ♀♀, San Jose del Cabo, 11 mi. W, June 28, 1967 (E. M. Fisher; LBSC). *Golfo de Calif.:* 1 ♀, Isla Espiritu Santo, Mar. 23, 1953 (P. H. Arnaud; CAS).

Polistes carnifex (Fabricius)

Vespa carnifex Fabricius, 1775. Systema entomologiae, p. 365.

Polistes carnifex, Fabricius. 1804. Systema piezatorum, p. 272.

Polistes onerata Lepeletier, 1836. Histoirie naturelle des insectes, hymenopteres, suites a Buffon, Paris, 1: 524.

Polistes valida Say, 1837. Boston Jour. Nat. Hist. 1: 389.

Polistes transverso-strigata Spinola, 1851. Mem. Acad. Sci. Torina, Ser. 2, 13: 78.

This wasp is one of the largest and most conspicuous *Polistes* in the Western Hemisphere. I recorded it (Snelling, 1955) from La Paz, Territorio Sur, where I collected a single female on the waterfront on July 7, 1953. Since that time there have been no subsequent captures of this species in this region. Consequently, it seems likely that the female which I captured represents an accidental introduction from the Mexican mainland; the species is common at Mazatlan, Sinaloa, and vessels from that port frequently travel to La Paz.

Until evidence to the contrary is advanced, I believe that *P. carnifex* should be dropped from the lists of peninsular vespids.

KEY TO SPECIES OF *MISCHOCYTTARUS* IN LOWER CALIFORNIA

Malar space nearly as long as width of antennal socket; mesopleurae without long, slender flexuous hairs; clypeal apex acute . . . . *fisheri,* n. sp.

Malar space about one-half as long as width of antennal socket; mesopleurae with numerous long, slender flexuous hairs; clypeal apex obtuse . . . . *flavitarsis* (Saussure)

Mischocyttarus (Kappa) fisheri, new species

Figure 4d-f

Diagnosis: This species belongs to the group of *M. flavitarsis* (Saussure) as defined by Richards (1945) and is most closely related to *M. flavitarsis* and *M. pallidipectus.* It differs from these and other members of the group by the following combination of features: malar space as long as diameter of antennal socket; pronotal furrow obtuse; pronotal keel obtuse over its entire length; first tergite longer than hind femora; propodeal furrow well defined; clypeus wider than long, with acute apex.

Description: Female/worker: Black; face below upper margin of ocular sinus light ferruginous, inner orbits and clypeal apex more yellowish; broad yellowish stripe along outer orbits to ocular summit, becoming light ferruginous behind; oblique occipital stripe, separated from outer orbital stripe by a narrow ferruginous occipital mark; scape and flagellum ferruginous, the flagellar segments infuscated over the apical six or seven segments; dorsal and anterior pronotal margins yellowish, remainder of pronotum light ferruginous; mesepisternum ventrally with large yellow mark behind front coxae; posterior half of prepectus yellow; scutum with two light ferruginous longitudinal stripes, coalesced over posterior third; scutellum ferruginous, lighter over anterior half; anterior half of postscutellum yellowish; two broad yellowish stripes on either side of propodeal midline; preapical ferruginous and narrower apical yellowish band on first tergite; subsequent tergites and sternites shading from blackish base to yellowish apical band, the greater part of the disc ferruginous; anterior femora with broad dorsal stripe and apical one-fifth ferruginous; mid and posterior femora ferruginous basally and yellowish apically, middle three-fourths blackish; remainder of legs ferruginous within, yellowish on outer surfaces. Wings brownish, with light ferruginous tones, veins and stigma ferruginous.

Head 1.17 times wider than long; clypeal width (between eyes) 1.2 times clypeal length; shortest malar length equal to diameter of antennal socket; interocellar distance one-third greater than diameter of anterior ocellus;

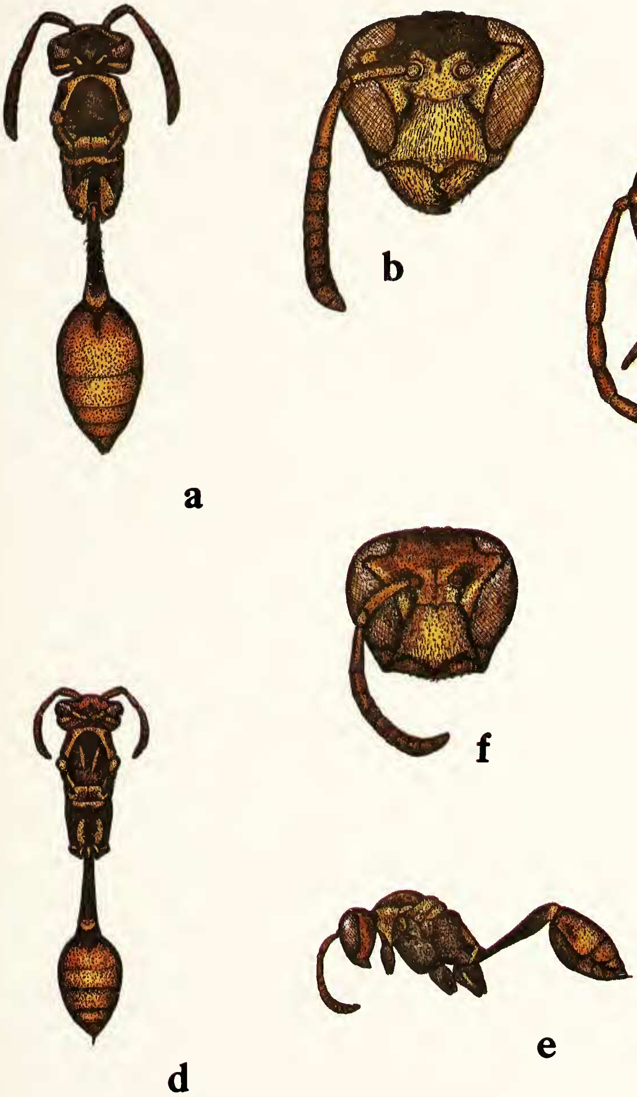

Figure 4. a-c, *Mischocyttarus flavitarsis*: a, female, dorsal aspect; b, female, head; c, male, head. d-f, *M. fisheri*: d, female, dorsal aspect; e, female, lateral aspect; f, female, head. All figures drawn to same scale.

ocellar-ocular distance about twice interocellar distance; postocellar distance about two and one-half times interocellar distance; scape 2.5 times longer than apical width, 1.36 times longer than first flagellar segment. Tentorial pits nearer antennal sockets than eyes. Frontal area dull, granulo-punctate. Upper three-fourths of clypeus finely, closely punctate, interspaces slightly shiny, apical one-fourth depressed, shinier, with numerous coarse, close punctures; apical margin acute. Eyes a little closer below than above, contiguous with clypeal margin for a distance subequal to antennal socket diameter. Gena slightly wider than eye in profile.

Thorax + propodeum about 1.6 times longer than wide in dorsal view, dull, everywhere granulo-punctate. Pronotum with anterior margin raised, but not reflexed, anterior furrow obtuse behind; lateral fovea present; keel, when viewed from above, gently and slightly curved, obtuse throughout. Postscutellum moderately flattened, its anterior margin below scutellum. Propodeum with narrow horizontal basal area, forming an angle with postscutellum, central furrow moderately broad and well defined, without central keel; dorsolateral margin of valve plate acute. Mid tibial spurs about equal in length; third and fourth mid tarsal segments slightly assymetrical; hind tarsi with inner lobe of third segment a little longer than outer lobe of fourth.

Tergite one a little longer than hind femora (10:9); anterior one-third, in dorsal view, with sides nearly parallel, then evenly expanded toward posterior margin, the latter about twice the basal width; spiracles hardly projecting in dorsal view, spiracular ratio about 5:7. Tergite two strongly expanded, slightly wider than long.

Entire body with very delicate suberect golden pubescence which does not obscure surface; mesopleura with scattered erect hairs about twice as long as the pubescence, but without obvious much longer hairs.

Length (front of anterior ocellus to margin of second tergite), 7.0-7.4 mm.; forewing 10.5-11.5 mm.

Holotype (Los Angeles County Museum of Natural History) and one paratype: La Laguna, 5500′, Terr. Sur Baja California, July 7-10, 1967, collected by E. M. Fisher. The paratype is in the collection of California State College at Long Beach. This species is named for its collector, who has collected many interesting social Hymenoptera in Baja California.

Although closely related to both *M. flavitarsis* and *M. pallidipectus, M. fisheri* may be separated readily from both species by the lack of long, slender, flexuous hairs on the mesopleurae. From *M. flavitarsis* it may be further separated by the more acute clypeal apex and from *M. pallidipectus* by the slightly shining, less distinctly punctate tegulae. In *M. pallidipectus* the tegulae are dull and granulo-punctate. In the key to the species of this group by Richards (1945) *M. fisheri* fails at couplet 4 since it fails to agree fully with either alternative.

Mischocyttarus (Kappa) flavitarsis flavitarsis (Saussure)

Figure 4 a-c

Polybia flavitarsis Saussure, 1854. Etudes sur la Familie des Vespides 2: 199. ♀.

Mischocyttarus flavitarsis, Bequaert, 1932. Ent. Amer., n.s. 13: 119-129. ♀, ⚲, ♂.

No specimens of this wasp have been seen from this area, nor are there published records of such occurrence. Since it does occur just north of Baja California, in San Diego County, California, it seems likely it will be found further south, in the chaparral areas of the Sierra San Pedro Martir and Sierra Juarez.

Polybia diguetana R. du Buysson

Polybia occidentalis var. *diguetana* R. du Buysson, 1905. Bulletin Societe entomologique France, 1905: 9. ♀, ⚲, ♂.

Polybia occidentalis var. *parvula* Bequaert, 1944. Bull. Mus. Comp. Zool. 94: 287. (in part).

Polybia diguetana, Richards, 1951. Transactions Royal Entomological Society London 102: 138-140.

Specimens examined: *Baja Calif.:* 2 ♀♀, Ensenada, June 10, 1950 (LACM).

These two specimens represent the first records for the genus *Polybia* in this area of Mexico and are a range extension of nearly 900 miles to the northwest into a very different type of habitat. Richards (1951) recorded *P. diguetana* from the states of Guerrero, Vera Cruz, Tabasco, Morelos, Oaxaca and Tamaulipas. I have a single female taken 39 mi. E of Villa Union, Sinaloa, on Aug. 27, 1960 by R. L. Westcott. This specimen and the two from Baja California compare favorably with samples from Vera Cruz (Cordoba, Presidio and Fortin de las Flores). This species is a member of the very difficult complex of *P. occidentalis* (Olivier), but the specimens from western Mexico do not differ from those of other areas and fit well the criteria established by Richards.

Acknowledgments

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RESUMEN

Cuatro generos de Vespidae sociales se encuentran en Baja California: *Vespula* (dos especies), *Polistes* (siete especies), *Mischocyttarus* (dos especies) y *Polybia* (una especie). Una nueva especie, *Mischocyttarus fisheri*, de Sierra Laguna ha sido descrita y un nuevo genero, *Polybia,* ha sido recientemente descrito procedente de Baja California. Claves para todas estas especies con ilustraciones para cada especie y amplios factores de distribucion aqui se incluyen.

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